UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/747,627	12/22/2000	Shinichiro Yamada	09792909-4734	1822

26263 7590 06/16/2003

SONNENSCHEIN NATH & ROSENTHAL
P.O. BOX 061080
WACKER DRIVE STATION
CHICAGO, IL 60606-1080

EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1746	18

DATE MAILED: 06/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No.	Applicant(s)	
	09/747,627	YAMADA ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4 and 6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4 and 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 31, 2003 has been entered.

This Office action addresses claims 1, 4, and 6. The claims are newly rejected under 35 USC §103, as necessitated by amendment.

Claim Rejections - 35 USC § 103

2. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsufuji et al (U.S. Patent 5,759,714) in view of Kato et al (U.S. Patent 6,150,055), in further view of Beauchamp (U.S. Patent 4,228,228) and Iijima et al (U.S. Patent 6,300,012),

Regarding claim 1, the patent of Matsufuji et al. is directed to a nonaqueous lithium secondary battery (see abstract). The negative electrode comprises a mixture of a non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 12, line 13; col. 13, line 4 et seq.; the Example). The tin oxide is made by a crushing and classification process (see col. 12, line 12 et seq.). The tin oxide and carbon material are mixed to form a

negative electrode composition and then coated on a negative electrode current collector (see col. 17, line 26 to col. 18, line 4). The coated negative electrode composition is then dried in a low-humidity air (see col. 14, line 39). Regarding claim 4, the negative electrode mixture is then hot-pressed to form a sheet (see col. 14, lines 47-54).

Matsufuji et al. do not expressly teach that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1, as recited in claim 1. The reference further does not teach that the carbon material is also crushed and classified, or that both materials are crushed and classified in an inert or dry air atmosphere. The reference further does not teach that the mixing, coating, and hot-pressing steps are performed in an inert or dry air atmosphere.

The disclosure of Kato et al. relates to nonaqueous lithium secondary batteries. In column 3, line 7 et seq., the reference teaches that a carbonaceous negative electrode is pulverized and classified.

Beauchamp discloses a lithium battery in column 4, line 11. In column 3, line 35 et seq., the reference teaches that "if highly reactive electrode materials are present, the preparation is carried in the absence of air and moisture, usually in a dry box under an inert atmosphere."

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Kato et al. to perform pulverizing and classifying steps on the carbon material of Matsufuji et al. In column 3, line 12, Kato et al. teach that "pulverization prior to heat treatment is important." Accordingly, the artisan would be motivated to carry out pulverization and subsequent classification steps during the processing of the carbon material of Matsufuji et al.

Furthermore, the artisan would be motivated to carry out all of the above-noted pulverizing, classifying, mixing, coating, and hot-pressing steps in an inert atmosphere. As noted above, Beauchamp states that "reactive" electrode materials must be processed in such an inert atmosphere. The artisan would recognize that the materials of Matsufuji et al. are indeed "reactive," because they tend to undesirably adsorb water from the air. This is a known problem in the nonaqueous lithium battery art, and is recognized by Matsufuji et al. at column 14, line 41 et seq. Therefore, the artisan would be sufficiently motivated to perform the pulverizing and classifying steps of the carbon and non-carbon materials of Matsufuji et al., in addition to the mixing, coating, and hot-pressing of the negative electrode, in an inert atmosphere.

Additionally, the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration "provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics." Accordingly, the artisan would be

motivated to use an average particle size of the graphite of Matsufuji et al. which is larger than that of the non-carbon active material, thereby falling within the claimed range.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasunami (U.S. Patent 6,371,995) in view of Watanabe et al (U.S. Patent 6,083,644), in further view of Iijima et al.

Yasunami is generally directed to a nonaqueous lithium secondary battery. The negative electrode comprises a mixture of a lithium-occluding non-carbon material (e.g., a composite tin oxide) and a carbon material (e.g., graphite; see col. 19, lines 25-30), and the positive electrode comprises a lithium composite oxide. In the abstract, the reference teaches that the positive electrode sheet, negative electrode sheet, and separator are wound into a battery can, and electrolyte is injected (i.e., poured) into the can.

Yasunami does not expressly teach that the winding and pouring steps are performed in an inert or dry air atmosphere, or that the ratio of an average particle size of the non-carbon material to an average particle size of the carbon material is less than or equal to 1.

Watanabe is generally directed to a nonaqueous lithium secondary battery. In column 14, lines 38-40, the reference teaches that the battery is assembled in a moisture-free or inert gas atmosphere.

The patent of Iijima et al. is also directed to nonaqueous cells. In the abstract, the reference teaches that an electrode comprises an active material and flake graphite, wherein the

central particle size of the graphite is larger than that of the active material. The active material may be tin oxide (see col. 4, line 31).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Iijima et al. to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the instantly claimed range. In column 2, line 20, Iijima et al. teach that this configuration "provides an electrode for a non-aqueous electrolytic cell having good charge and discharge characteristics such as discharge capacity and charge and discharge cycle life, and improved in physical characteristics." Accordingly, the artisan would be motivated to use an average particle size of the graphite of Yasunami which is larger than that of the non-carbon active material, thereby falling within the claimed range.

Additionally, the artisan would be motivated by the disclosure of Watanabe et al. to assemble (i.e., perform the winding and pouring steps) the battery of Yasunami in an inert gas atmosphere. In the cited passage, Watanabe et al. teaches that this is "desirable," and further teaches that it is "preferred...from the point of cycle property" if the electrodes have a water content of less than 50 ppm. Accordingly, the artisan would be motivated to perform the winding and pouring steps of Yasunami in an inert gas atmosphere.

Response to Arguments

4. Applicant's arguments filed March 31, 2003 have been fully considered but they are not persuasive. In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the disclosures of the Beauchamp and Watanabe references regarding the handling of electrode materials and assembling of batteries in an inert atmosphere are believed, on their own merits, to provide sufficient guidance and motivation so that one skilled in the art would arrive at the claimed invention when applying these teachings to the other cited references.

With regard to claim 6, Applicants urge that Watanabe's general statement about "assembling" a battery cannot be construed to read on Applicant's specific subject matter. The Examiner maintains that the disclosure of "assembling" the battery in an inert gas atmosphere fairly suggests the steps of winding the electrodes and pouring the electrolyte into the battery in an inert gas atmosphere. Such disclosure of "assembling" the battery in an inert gas atmosphere

would reasonably suggest to the artisan to perform as many of battery assembly steps as possible in that atmosphere. Therefore, performing the winding and pouring steps of Yasunami et al. in an inert atmosphere would be obvious to the skilled artisan. Applicants further state that these steps produce a "previously unknown benefit," that is, that the negative electrode is prevented from degrading due to the absorption of moisture. However, it is submitted that keeping the components of a lithium battery moisture-free is a well-known concept, as evidenced by the disclosure of Watanabe. Watanabe discloses that it is "preferred... from the point of cycle property," implying that degradation caused by moisture leads to capacity fade over time. See col. 14, line 51 of Watanabe.

Conclusion

5. The following notes are made with respect to the references cited in the International Search Report which bear an "X" label:

EP 1045465 is the only document that bears such a label, but does not qualify as prior art.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

June 13, 2003

J. Crepeau
Jonathan Crepeau
Patent Examiner
Art Unit 1746